

AMENDMENTS TO THE CLAIMS:

This list of claims replaces all prior versions and lists of claims.

1.-24. (canceled)

25. (previously presented) A process for the production of amorphous, crystalline, or mixed oxides of metals having mean particle diameters of 1 to 500 nm, comprising the steps of providing an electrolysis cell having a cathode in a cathode half-cell and an anode in an anode half cell, providing in the electrolysis cell a solution comprising ions of a metal or metals from which the oxide particles are to be formed dissolved in an organic electrolyte, and electrochemically reducing the metal ions at the cathode in the presence of an oxidizing agent while impeding or preventing passage of halogens from the anode half cell to the cathode half cell, to form the oxide or oxides.

26. (previously presented) The process of claim 25, wherein the oxides have mean particle diameters of 1 to 100 nm.

27. (previously presented) The process of claim 25, wherein passage of halogens from the anode half cell to the cathode half cell is impeded or prevented by a porous partition or separating wall having a high halogen retention capacity.

28. (previously presented) The process of claim 27, wherein the porous partition or separating wall is a porous glass frit.

29. (previously presented) The process of claim 28, wherein the frit has pore diameters of about 1 to 4 μm .

30. (previously presented) The process of claim 27, wherein the porous partition or separation wall comprises a polytetrafluoroethylene filter, a polytetrafluoroethylene membrane, or a porous polyethylene film or polyethylene disk.

31. (previously presented) The process of claim 30, wherein the porous partition or separation wall has pore diameters of about 1 to 4 μm .

32. (previously presented) The process of claim 27, wherein the porous partition or separation wall comprises a proton-conducting membrane.

33. (previously presented) The process of claim 32, wherein the proton-conducting membrane has pore diameters of about 1 to 4 μm .

34. (previously presented) The process of claim 32, wherein the proton-conducting membrane comprises a perfluorinated ion exchanger membrane.

35. (previously presented) The process of claim 34, wherein the perfluorinated ion exchanger membrane has pore diameters of about 1 to 4 μm .

36. (previously presented) The process of claim 25, wherein the organic electrolyte comprises a substance that is liquid at about -78°C to about $+260^{\circ}\text{C}$ at normal pressure.

37. (previously presented) The process of claim 36, wherein the organic electrolyte comprises a substance that is liquid at about 0°C to about 60°C at normal pressure.

38. (previously presented) The process of claim 36, wherein the organic electrolyte comprises a compound selected from the group consisting of ketones, alcohols and polyalcohols, ethers, nitriles, aromatic compounds, and mixtures thereof.

39. (previously presented) The process of claim 38, wherein the organic electrolyte comprises a compound selected from the group consisting of n-propanol, i-propanol, glycerol, and mixtures thereof with acetone, tetrahydrofuran, acetonitrile, or toluene.

40. (previously presented) The process of claim 36, wherein the organic electrolyte comprises up to about 2% by weight of water.

41. (previously presented) The process of claim 40, wherein the organic electrolyte comprises about 0.05 to about 1% by weight.

42. (previously presented) The process of claim 36, wherein the organic electrolyte additionally comprises one or more supporting electrolytes selected from the group consisting of electrolyte-soluble hexafluorophosphates, sulfonates, acetyl acetonates, carboxylates, and quaternary phosphonium and/or ammonium salts.

43. (previously presented) The process of claim 42, wherein the organic electrolyte additionally comprises one or more surfactants.

44. (previously presented) The process of claim 43, wherein the surfactants are selected from the group consisting of fatty alcohols, fatty alcohol ethoxylates, polyoxyethylene carboxylic acids, fatty acid ethoxylates, and mixtures thereof.

45. (previously presented) The process of claim 42, wherein the supporting electrolyte comprises a quaternary ammonium compound that optionally carries one or more aryl and/or alkyl groups at the nitrogen.

46. (previously presented) The process of claim 45, wherein the quaternary ammonium compound is present as a halide.

47. (previously presented) The process of claim 46, wherein the quaternary ammonium compound is tetrabutyl ammonium bromide.

48. (previously presented) The process of claim 25, wherein the organic electrolyte has a temperature of 30 to 120°C.

49. (previously presented) The process of claim 25, wherein the oxidizing agent comprises one or more compounds selected from the group consisting of oxygen, hydrogen peroxide, peroxy compounds, and oxo anions of halogens chlorine, bromine or iodine, where the halogen has an oxidation number of +1 to +5.

50. (previously presented) The process of claim 49, wherein the oxidizing agent is atmospheric oxygen supplied by introduction of air into the electrolyte solution.

51. (previously presented) The process of claim 25, wherein a current density of 0.05 to 10 mA/cm², based on the anode area, is obtained.

52. (previously presented) The process of claim 51, wherein a current density of 1 to 5 mA/cm², based on the anode area, is obtained.

53. (previously presented) The process of claim 25, wherein an electrical d.c. voltage of 1 to 100 volts is applied between cathode and anode.

54. (previously presented) The process of claim 25, wherein the electrolyte is agitated.

55. (previously presented) The process of claim 54, wherein the agitation is effected by stirring, introduction of a gas, and/or ultrasonication.

56. (previously presented) The process of claim 25, wherein the anode and/or cathode comprises a material that is inert during the electrolysis.

57. (previously presented) The process of claim 25, wherein the anode and/or cathode comprises a material selected in from the group consisting of platinum, platinum alloys, gold, niobium, tantalum, tungsten, graphite, glassy carbon, and combinations thereof.

58. (previously presented) The process of claim 25, wherein the metal ions dissolved in the electrolyte are produced by dissolving in the electrolyte a salt of the metal or salts of those metals whose oxide or mixed oxide is to be produced.

59. (previously presented) The process of claim 58, wherein a halide, nitrate, acetate, sulfonate, carboxylate or hexafluorophosphate is used as the metal salt.

60. (previously presented) The process of claim 25, comprising the production of mixed oxides of at least two

metals, wherein the metal ions dissolved in the electrolyte are produced by dissolving a salt of one metal in the electrolyte and using an anode comprising the other metal as a sacrificial anode.

61. (previously presented) The process of claim 25, wherein the metal oxide or oxides formed are separated from the electrolyte and dried.

62. (previously presented) The process of claim 61, wherein the dried metal oxide or oxides are calcined or subjected to a hydrothermal treatment.

63. (previously presented) The process of claim 62, wherein the calcination takes place at a temperature of about 300 to about 1200°C.

64. (previously presented) The process of claim 63, wherein the calcination takes place at a temperature of about 400 to about 1,000°C.

65. (previously presented) The process of claim 25, wherein the metals from which the oxide or oxides are formed are one or more selected from the group consisting of the third to fifth main groups and the secondary groups of the periodic system.

66. (previously presented) The process of claim 65, wherein the metals from which the oxide or oxides are formed are one or more selected from the group consisting

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of titanium, zirconium, chromium, molybdenum, iron, cobalt,
nickel, indium, tin, lead, and aluminium.